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Spending Time with Money: from shared values to social connectivity

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ABSTRACT

There is a rapidly growing momentum driving the development of mobile payment systems for co-present interactions, using near-field communication on smartphones and contactless payment systems. The design (and marketing) imperative for this is to enable faster, simpler, effortless and secure transactions, yet our evidence shows that this focus on reducing transactional friction may ignore other important features around making payments. We draw from empirical data to consider user interactions around financial exchanges made on mobile phones. Our findings examine how the practices around making payments support people in making connections, to other people, to their communities, to the places they move through, to their environment, and to what they consume. While these social and community bonds shape the kinds of interactions that become possible, they also shape how users feel about, and act on, the values that they hold with their co-users. We draw implications for future payment systems that make use of community connections, build trust, leverage transactional latency, and generate opportunities for rich social interactions.

Author Keywords

Ubiquitous computing; digital money; mobile payment; trust; community; prosocial computing, social practices.

ACM Classification Keywords

H.5. Information interfaces and presentation (e.g., HCI)

INTRODUCTION

Money has a highly complex role in modern society and plays a critical role in a huge range of our activities. As users of money, we are perhaps most familiar with it as a form of exchange for goods and services, an area that is rapidly undergoing change through the introduction of digital payments over the internet and, more recently, on mobile devices. This paper presents a study of how users make payments through one such mobile technology, and how this impacts on their activities, understandings and social interactions. In our analysis, we explore how user practices

contrast against the rhetoric of the computer industry in automation, and of the ways that the banking and financial services industry have positioned payment technologies as a route to enabling ‘frictionless’ consumption.

In this regard, the role of technology is often presented as a means of automating complex, difficult, dangerous, time-consuming or otherwise unpleasant activities. Take for example, speed: it is a broadly held, if implicit, assumption that computers, and our interactions with them, should be fast and effortless. Chip designers appear to be highly concerned with faster processing, network engineers with data transmission speeds, and within the HCI literature, numerous papers report on methods and techniques to optimize interfaces to support rapid task completion. Yet, faster interactions are not always better interactions, and this is especially so where device interactions operate at a pace that is not well matched to their users’ abilities to make sense of, and react to this. This bringing together of fast digital processing, network connectivity and methods of interaction has also been applied to financial systems. Industry leader Visa’s payWave card system promotes itself as “*fast, convenient and secure and means you can wave goodbye to cash... Payments are completed in less than a second ... and means no more fumbling for the right notes or coins or waiting for change – just quick, hassle-free transactions*” [46]. A variety of mobile payment systems make similar claims, operating over a variety of technical protocols, transactional systems and devices with claims that they are rapid and trustworthy (usually described as ‘secure’, ‘safe’ and ‘encrypted’): features that lie at the core of any credible financial system, let alone a digital one.

The move towards speed and ease of payment has been a slow progression, and has had to be balanced against the trustworthiness of such transactions to manage the exchange of goods, from like-for-like in barter, to shells, tusks and beads, precious metals, bullion coinage, tokens, IOUs, banknotes and electronic payments (amongst others). Each media or technological development of exchange has been associated with material and social practices that shape and are shaped by them, but as transactions become faster and requiring of less inspection for credibility, there are fewer opportunities to engage in these practices. Indeed, cumbersome and slow interactions have been recognized to have been involved in the failure of previous mobile payments systems [37], and when payment systems provide clumsy solutions, they can cut across ‘the physical

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environment and the behaviors associated with payments in local stores. Consumers have deeply ingrained habits to pay in certain ways with associated physical behaviors’ [ibid, pp. 9-10]. What then is lost as digital transactions remove opportunities for social and material exchange, and how might mobile technologies be designed to reconnect any such lost opportunities?

In this work we consider these questions in the context of digital transactions of the Bristol Pound payment system. We first frame the current research with respect to related work on digital currency, mobile money and the user experience in relation to time. We then present the Bristol Pound payment system, and our mixed method approach to studying it. Our findings detail the social practices around transactions and how users describe their interactions with the payment system, we extend these to develop implications for design.

RELATED WORK

There has been a great deal of research examining interaction and collaboration around mobile money in developing countries. In particular, M-Pesa, a mobile phone payment system, has been studied in detail (e.g. [33]) with attention to key themes such as trustworthiness and security [34], and how the system addresses the specific financial needs of developing economies [9]. While we similarly draw on an ethnographic approach to research mobile money, our study resides not in a developing economy, but a developed one, is not targeted at the unbanked, and is not tied to a particular mobile network operator in the way that M-Pesa is tied to Safaricom/Vodafone through its business model and technology platform. Our own study of mobile money in the relatively wealthy ‘developed’ world is very different to this work which forms the core of the literature on the use of mobile money.

Our particular interests in mobile money here lie in the value, use and interpretation of mobile money, and in this respect, the sociological and anthropological literatures around monetary practices are especially enlightening (for an excellent introduction, see Maurer [29]). There are broadly two competing schools of thought, the first building on standard economic models in which money allows depersonalised (cf. [4]) and asocial quantified value transfers [28, 41, 48], and the other, in which money is both produced through and shapes our social relations (traditionally seen through the lens of rank and prestige). Within economic anthropology, there is a long history and debate about how money operates as a medium of exchange and a store of value, and how the practices forming around this impact on social and cultural institutions. Granovetter [15], for example, explores how the embeddedness of rational economic choices is woven into on-going systems of social relations, so for example, the cultivation of personal relationships can, in some instances, assume equal or greater importance than the economic transactions themselves. On a similar theme, Zelizer’s extensive work examines social practices around money and the circumstances that shape

those practices, with an orientation to shared understandings and interpersonal relationships. Related to our own work on local currencies, Bohannon [5] introduced the concept of *general-purpose* and *special-purpose* money, with the (now disputed, see for e.g. [17]) idea that special-purpose money (e.g. wampum and cowries) was restricted to particular forms of use, and could only circulate within restricted ‘spheres of exchange’. The increasing availability of general-purpose money circumvents these spheres of exchange, causing social disruption. It is interesting to consider that modern local currencies that restrict ‘spheres of exchange’ are often paradoxically created to promote social harmony.

Our work extends the utilitarian view of money as *capital* to explore the ‘extraeconomic, social basis of money’ [50]. Following Zelizer [50], we approach the study of mobile money and its exchange as necessarily a study of how meaning and value are assigned by those who use it, and recognise that it lies at the intersection of technological design, culture, and economic exchange. Studies in the HCI literature have investigated people’s values, practices and everyday concerns when conducting financial transactions, including the circumstances in which they do so (e.g. [24, 45]). Some have focused particularly on digital money use across different countries and applications, connecting cultural aspects with the design of software. Mainwaring et al.’s ethnographic study of digital money use in Japan shows how cultural aspects can be leveraged to design mobile payment systems that fit with the context of its users [26]. Illustrating this point, the paper opens a discussion on how to minimize commotion during digital transactions while also upholding “aesthetic pleasure”. By studying how online gamers in China perceive, obtain and spend virtual currency, Wang and Mainwaring explore how the gaming experience is shaped, heightening its realness, trust, and fairness [47]. Yang et al.’s [49] study shows how reflecting Chinese cultural practice successfully in the design of the virtual currency of an online community allowed that community to express that practice (‘guanxi’) and subsequently thrive. Community is a recurrent theme that shows up in the literature on financial practices, with time-banking being explicitly set up to benefit community relationships; Bellotti et al. [3], for example, explore how time-dollars are earned and spent, developing design implications which recognise that relationships are formed and maintained through transactions.

Virtual currencies in gameworlds (e.g. Linden Dollars in SecondLife or ‘gold’ in World of Warcraft) hold the strange character of being purchasable for real money, but only holding practical value within the game. Greengard [16] suggests that behaviours with virtual currency have implications beyond the gameworld, affecting the course of tax legislation. Similarly, Bitcoin is a digital currency that has gained considerable media attention through the debates in the international community regarding its legislative status—as money [43] or as a commodity [40]. One feature of Bitcoin transactions is the time it takes for the transaction to

be verified, and therefore, completed. Karame et al. [23] have investigated the times involved in payment verification, and concluded that Bitcoins are not a good fit for fast payments, i.e., exchanges where payment for goods and receiving them takes a “few seconds.” Their investigation describes how delayed payment makes the system prone to double-spending when accepting immediate payments, but they reveal little about how these delays shape the user experience.

Time experienced during interactions with technology has been demonstrated to hold implications for the user experience (e.g. [25, 35]). Of special interest to us here is how the speed of an interaction can support experiences of reflection and pleasurable anticipation around interactions, changing perceptions of value and meaning around digital media. Further, how long or short waiting time is, or how slow or fast response times are, hold meaning for those participating in the interaction, such that Sundar et al. [44] propose guidelines for designing mobile interfaces based on users’ expectations around time. Harmon & Mazmanian’s [20] study of the use of smartphones mentions the temporal aspects of mobile interactions, exploring response speed as it relates to perceptions of togetherness and community, but time is not considered as a main object of study. Other designers have attempted to take conscious control of time around interactions. Games designed by Hong et al. [21] are instances of designers specifically harnessing the intervals in slow interactions usually spent waiting; in this case the time spent waiting at a printer. Designers have also deliberately slowed interactions down, introducing the concept of “slow technology” to counter the trend in striving for better productivity and efficiency with technology [19].

RESEARCH CASE

The Bristol Pound

The Bristol Pound (£B) is a local complementary currency in use in Bristol, England (Population: 432,500; the 6th largest city in England). It was launched by the Bristol Pound CIC (Community Interest Company) in September 2012 and as of July 2014, there are approximately £B620,000 in circulation with over 650 businesses listed in their directory as members. The currency is both paper-based and digital. Transactions occur in printed notes (in denominations of £B1, £B5, £B10 and £B20), SMS on any mobile phone, or online via an electronic account similar to a bank account. Printed notes are accessed from a number of businesses at various locations in the city (known as cash points). Anyone can exchange sterling for £B notes free of charge, but once sterling has been exchanged for £B notes, the notes cannot be exchanged back into sterling. Payments by SMS and online differ from this access model in that they require an electronic £B account. Eligibility to open an electronic account is granted by the Bristol Pound CIC, subject to certain rules based on membership type. Exchanging electronic £B for sterling is possible—by withdrawing £B from an account as sterling – but this incurs charges. £1

sterling is equivalent to £B1 and businesses in the city trade in £B on a voluntary basis.

The Bristol Pound CIC

The Bristol Pound Community Interest Company (CIC) is a not-for-profit company incorporated on 16 August 2010 that administers the £B. The CIC have registered physical premises in the centre of Bristol from where a team of individuals conducts the day-to-day tasks of running the currency. At the time of our study the core team of the Bristol Pound CIC consisted of four directors, one communications and events manager, one trader manager, one accounts and office manager, one technical director, one project coordinator, one project manager and one poet-in-residence. There were also six assistants on the team. All roles on the team were working on a volunteer basis. From this point on we will refer to the team administering the currency as the £B team.

Bristol Pound Membership Types

Membership of the scheme falls into two categories: *Individual* and *Trader*. Businesses can become trader members, and hence maintain a £B account, if they are locally owned and operated. Individuals may become members and granted accounts if they reside or work in Bristol. From this point on we will refer to individual members and traders members as either ‘users’ or ‘members’ as required by the context.

Txt2Pay

Txt2Pay (T2P) is the platform that enables business and individual Bristol Pound members to conduct transactions via SMS. It is implemented on the Cyclos platform (cyclos.org), which is widely used for mobile and online banking by commercial banks internationally, as well as social enterprises such as the Bristol and Brixton pounds. T2P is a type of mobile money transfer in which business members and individual members can exchange electronic £B, irrespective of their mobile network operator. There is one mobile phone number to which all SMS payments are sent. When a member pays another member by sending an SMS text message, the payer transfers the amount in electronic £B from their account to the payee’s £B account. SMS texts are charged by mobile network operators at their standard rates and the payee incurs charges when receiving electronic £B via T2P. In the next section we describe a typical T2P transaction to set the scene for our more detailed examination of interactional features in our discussion that follows.

Vignette: a typical SMS Transaction

Andy is hungry and visits the small café near his office that sells his favourite coffee. It is lunchtime and the ordinarily empty café is bustling with people. He grabs a sandwich, falls into the queue and almost immediately two more people fall in behind him. While he checks his phone for new text messages, he glimpses his latest £B balance request and remembers that he has about £B10 in his account. The text confirms a balance of £B9.85 and he decides to use £B to

pay. When it is his turn, Jo, the café owner greets him by name and takes his order. While the coffee is being made, Andy tells Jo that he would like to use Txt2Pay. Jo smiles and reaches for the mobile phone lying on a shelf directly below the cash register. Andy composes a text message on his phone and sends it. A few moments pass, and they chat about the building work in the street outside, holding their phones within eyesight. 30 seconds later, Jo's phone beeps, and she confirms that the payment has gone through. Andy waits for the confirmation text message to appear on his phone. As it arrives, Andy's coffee is poured into a cup. Andy thanks Jo, who says, "See you tomorrow, Andy!"



Figure 1: Demonstrating Txt2Pay use from instructional video provided by the Bristol Pound CIC. Source: bristolpound.org.

This scenario, drawn from our observations and interview data, is typical of many T2P transactions, and while there is variation in the detail of the transactions, it illustrates aspects of interactions that we will return to in our analysis. Fig. 1 depicts the typical arrangement of the transactors during the T2P transaction. T2P usually involves transactions when both parties are collocated (although this is not a requirement), and with merchants or service providers that are independently owned or run. Most member businesses operate within a specified geographical region (in this case, within 50 miles of the Bristol area).

METHODS

The aims of the study were to examine the values and needs of the community of £B users, including traders that accept £B and the currency administrators, and explore the implications for designers to reflect and support these patterns of use, practices and values in digitally augmented media. We report on findings from a survey and fieldwork conducted in Bristol (UK), presented in separate sections that address quantitative and qualitative dimensions. Although the primary focus of this paper is on the experiences of users and their practices around the use of the £B, quantitative data allows us to examine the proportion and frequency of use in spending, their length of experience with it, spending characteristics, and user demographics to illustrate the breadth of its use, and the penetration of the currency into people's everyday lives.

Bristol Pound Member Survey

The online survey was run with Bristol Pound members in conjunction with the £B team who helped promote and publicise it. The number of respondents who attempted the survey was 197, of which 152 completed it. The 45 partial

survey responses are included in the analysis. Respondents were not paid for participation. As well as quantitative data, the survey included open questions enquiring about respondents' reasons for joining the £B, its value to them, reasons for using or not using the printed and T2P versions of the £B, and its problems and effects on them personally. For the quantitative data, SPSS was used to obtain summary statistics from the responses.

Membership and demographics: At the time of the survey, 34.5% of respondents had been Bristol Pound members for the 12 months that the Bristol Pound CIC had been in existence for, with 26.4% of respondents as members for 6 months or less (N=197). Of the total respondents, 68 indicated that they were female and 83 male. Respondents ranged from 20 to 72 years old with a median of 44 years (N=149). Respondents included 128 (84.2%) employed, 6 students (3.9%) and 10 retirees (N=152). Those employed reported to be in professional occupations (57.7%), managers (19%), while the remaining included technicians, administrative support workers, one craft worker, labourers or helpers, service workers, voluntary workers and homemakers (N=142). All respondents lived, worked and/or studied within a 10-mile radius of the centre of Bristol. We anticipate that the majority of these members have basic competence in using computers: among the respondents, most applications for Bristol Pound membership were lodged online (52.3%, N=197).

Frequency and values of spending: Of all respondents answering this question (N=156), only 1 reported spending £B several times a day, 7 respondents spent them every day, while the spending frequency for the remaining respondents were a few times a week or less. The largest group of respondents reported spending them less than once a month (32.1%, N=156). Average use of £B was reported to be 14.1% of weekly spend (N=150 ranging between 0% to 80%). The largest proportion of respondents (56.8%, N=155) reported an average spend of 0 - 20 electronic £B per week from their accounts. The next largest proportion (18.1%, N=155) reported an average spend of 21-40 electronic £B per week. This is spending either online or using T2P. Only 3.9% of respondents (N=155) reported to spend more than £B60 per week from their account.

We recognise that any survey conducted online is open to sampling bias in the sense that those individuals who choose to respond online may have different characteristics to those who choose not to respond. This has to be taken into account when interpreting the results of the Bristol Pound member survey. It is possible that some members may not have access to the Internet. However, this is a low probability in a developed, well-connected city such as Bristol, UK, and also because members who use T2P are required to join an online account in order to make or receive payments.

Qualitative data and analysis

Interviews and ethnographic observations were conducted over a 3 month period to explore the behaviour, patterns and

practices around £B use in context. Participants include individual members and traders (trader is the term used by the £B team to denote both sellers of goods and services, as well the business members of the Bristol Pound), as well as the £B team administering the currency. The qualitative findings are based on the authors' personal shopping experiences using £B, participant observation through involvement with the £B team at their premises, and formal and ad hoc interviews with individual and trader members. The authors used the (printed) £B while shopping with trader members and observed T2P payments in at least three different locations in Bristol (including a café, a market stall and a road side food stall). Ad hoc informal interviews were conducted at these times. Formal interviews were conducted with 18 participants. Of these, 17 participants were contacted on the basis that they agreed to be formally interviewed as part of the survey, and one member from the £B team, the trader manager, was formally interviewed. Table 1 shows the demographics of interview participants. Using the survey data reported, we categorised respondents into higher (>10% of spend) or lower spenders (<5% of spend) in £B, approximately split evenly across both groups. In addition, participants were deliberately selected from a range of backgrounds, ages and income groups, and split evenly across gender, allowing us to get a broad range of views and patterns of £B use. Interviews were either face to face in a café setting, their workplaces or via Skype (two). The interviews, of approximately 30 minutes duration, were audio recorded and transcribed for analysis. Interviews were semi-structured and open-ended allowing the interviewer to follow topical trajectories.

<i>Age</i>	
Median	46
Youngest	25
Oldest	69
<i>Gender</i>	
Male	9
Female	9
<i>Spender type</i>	
High	9
Low	9
<i>Membership type</i>	
Individual	14
Trader	2
Both (individual and trader)	1
£B team	1

Table 1: Demographics of the 18 interview participants.

Working through specific examples of their recent spending, we focused on themes around interviewees intentions in using the £B, how they used T2P and its problems, differences in their use and understanding of paper and T2P transactions, and the ways that they understood, used and distinguished between £B and sterling in transactions.

Our analytic approach was data-driven such that the themes that emerged from our iterative scrutinising of the data were

grounded in examples from our interviews, field notes and survey responses. The data was scrutinised for descriptions of behaviours in relation to the T2P system. Patterns in the data were identified and named according to the process described by Braun and Clarke [7]. In the findings that follow, we do not attempt to quantify the qualitative data, but rather examine *how* and *why* these concerns are of relevance to our analysis: verbatim quotes from interviews here are used not as evidence or proof, but as illustrations of reported events and to enable the participants' 'voice' to come through. Where individual instances of data that are of sufficient interest to report are discussed in the analysis, this is noted. In the analysis below of this qualitative material, we also include material from both the open questions in the survey and the interviews. Participant quotes are labelled [xyz] where x is either 's' indicating that the quote is taken from the survey open questions, or 'i' indicating that the quote is taken from an interview; y indicates the participant's Bristol Pound membership type and can be either 'i' for individual members, 't' for traders or 'a' for £B team; z is a number assigned to each participant and is unique within the categories of interview participants and survey participants. Thus participant 6 in the survey who was also a trader would be labelled as 'st06' and participant 6 who was an interview participant and an individual member would be labelled as 'ii06'. These would not necessarily be the same individual as not all survey respondents identified themselves by name. In the sections that follow, we describe how the participants in our study described their use of the T2P system and interactions around T2P transactions.

TRANSACTIONAL CONCERNS

Our interest in the role of time in making £B payments was initially identified in the qualitative reports from the survey results. Several respondents explicitly reported that T2P mobile payments were too slow and cumbersome. The response "*Transaction takes too long, is too fiddly*" [si011] is typical of these, and points to a recognition that the temporal and interactional demands on making payments is high. Compared to payment in the form of *handing over cash* or *waving* a plastic card, payment by T2P introduces more points in the transaction where interactional variations can occur. Transactions using T2P may be slowed down for several reasons and for variable amounts of time. Users may wish to verbally confirm with the trader that payment by SMS is possible, for example, counter staff may not know how to use the equipment, or their mobile phone or fixed terminal may not be working. Prior to making the transaction, payment details have to be manually typed in on occasionally awkward keypads (function phone keypads often being especially slow to use, and T9 variants making non-standard text strings error-prone). These payment details must then be checked to ensure that the correct recipient details and sum are included in the text, and this may only be possible to determine after the cost of several items are totalled up. Where mobile phone coverage is poor, the payer may need to check that their mobile phone has a signal

before sending, and the trader has to receive the SMS payment confirmation to ensure that the transaction has been processed. Several of these factors may come together to produce complex and extended sequences of interaction.

While the some of the sentiments of the survey respondents align with trends in more efficient, faster and secure interaction, the data presents a complementary account, i.e., one in which these transactions offer rich social interactions through which individuals are able to express themselves as members of their community. Pulling out data in which participants reported on their £B transactions, we identify three analytic features that offered opportunities for users to engage in: (1) pleasure and play, (2) conversation and sociability, (3) mindful reflections on purchases and patterns of spending, and (4) trust judgements. We present each of these topics in turn below.

PLEASURABLE TRANSACTIONS

Opportunities for playfulness

As we have seen, T2P payments could vary in their interpersonal demands, while at the same time requiring different forms of device interactions and providing different forms of feedback to cash or card-based payments. Building on top of these differences provided unexpected and occasionally interesting outcomes:

“For me it was like, wow, this is really cool and really fun.” [ii12]

The relatively slow, and in particular, the unpredictable speed of the transaction allowed its users opportunities to fill this time with ludic, or playful interactions (cf. [14, 22]). Such opportunities were shaped around the social interactions and spaces that the transactions were situated in. This opportunity for playfulness occurred not so much with the technology (which has a rigid interactional format), but with the way that the digital payment interactions were formatted and temporally paced to match the unfolding purchasing transactions. In a quote from one informant, we see an element of fun and competition where the buyer and seller are both waiting for a confirmation text. Although this appears to be a random process, the participant describes the arrival of the first text as winning a kind of informal ‘bingo’ game with the name of the other participant being used here as a ‘winning’ call out that completes the interaction:

“Txt2Pay’s more fun because you can’t do that with normal money. You can’t do that with a card...You’re both standing there with your phones waiting for the first one to beep. And someone says “Oh is your name John” and I say “Yeah” and it’s quite nice.” [ii05]

The informant makes a clear distinction between traditional ‘normal’ forms of money, which afford different, and less informative, social interactions; it brings together elements of anticipation, a quantifiable (chance) result, completion and tension relief, alongside the pleasant social nicety of being introduced to someone by name. While these are not

elemental or necessary requirements of gameplay, the informant reflects on these features as being both competitive and sociable. The nature of paying using T2P and the ‘special’ (cf. [51]) status of this form of money is described here as involving a kind of ‘fun’, and something very different than can be achieved with other forms of payment. We cannot discount the fact that this may be due to the novelty or infrequency of its use, but the way that it is usually the individual’s personal phone being used, personal details exchanged, and the fact that both users are aware that they share membership of an unusual ‘club’ or scheme, that makes this experience notably and qualitatively different from paying with other forms of money.

Pleasure in Spatial Exploration

The playfulness with this special money extends beyond the T2P transaction itself to the activity of finding a place to use T2P. As we have already identified, while many places in Bristol do accept £B, many more – indeed, the vast majority – do not. The £B team provides a searchable map (via the Google Maps API) of the approximately 600 retailers that accept £B (electronically or as cash) on their website, and this is also reported as being used in playful games of searching out new places to visit and go shopping:

“Using the online directory on the £B website. I look on the map, who’s near me, where can I spend my money?” [it04]

That people may experience fun (e.g. [1]) and pleasure (e.g. [31]) from shopping is hardly a novel finding, but the implementation of the interactive map (often accessed on the same smartphones that are used in making payments) provides an opportunity and motivation to explore new areas of the city. In some ways, this is similar to user practices around geocaching (e.g. [36]), in providing a new way to explore and experience our spatial environment, building on different motivations and perspectives than simply heading off into unknown locations.

Extending this finding of goal-based spatial exploration, participants also reported that they enjoyed the experience of being the first to spend £B with traders:

“There’s a veg shop up in Wells Road and I was the first one to spend £B there.” [ii06]

There is currently no technical way to identify a first-to-spend with a trader, so this was evidently notable enough for some verbal discussion to have taken place between the trader and customer, and worthy of report to have brought up, unprompted, in an interview. This was not just visible in our interview data collection: social media was actively deployed to do this in a somewhat similar way to “checks-ins” and claiming badges on FourSquare.com [12]. A typical example drawn from the @BristolPound Twitter feed of this kind of behaviour can be seen in fig. 2, in which a Twitter user records their first-to-spend status, with a linked photo of a cup of coffee to evidence their purchase, and an encouraging comment linked back to the trader’s twitter account:



Figure 2: Tweet claiming first to spend with T2P

This ‘checking in’ can be likened to a form of playful activity in ‘winning’ a game or race in doing so, while simultaneously using these episodes as vehicles for promoting a representation of themselves via their digital personas as ethically-minded.

SOCIABILITY

Transaction As Conversation

Speech is more than an instrumental way of getting things done (e.g. [27]), allowing us to build rapport and social bonds. Buying things in shops or in service transactions can offer opportunities for these kinds of sociable interactions, especially where these are in local communities. Placencia [39] describes the ways in which transactors in neighbourhood corner shops try to engage in social interaction that is personal, for example through greetings and goodbyes, respectfulness and wit, rather than simply fulfilling the institutional roles of shopkeeper and customer. The kinds of shops and services that have been allowed to become trader members of the Bristol Pound have a close fit with Placencia’s neighbourhood corner shops, and performing payment via SMS was reported as a welcomed opportunity for phatic conversation:

“It is very rare that you have a Bristol Pound transaction where it is just routine, where you don’t really speak beyond the kind of set phrases.” [ii08]

This is an area of interaction that is directly challenged by the recent industry move towards faster forms of digital payment. With rapid, anonymous transactions comes the potential for losing this sociable interaction and the loosening of social bonds between local buyers and sellers, and consequent weakening of community connections.

This anticipated loosening of bonds seems to be in direct contrast with what we have ourselves observed and had reported in the use of £B. In part, this is due to the technical demands of making a T2P transaction, which provides users with an opportunity to make conversation with one another. Compared to other traditional forms of payment, the relatively slow pace of the technology in the transaction itself opens up interactional space for a degree of conversational engagement, and the relative complexity of the mechanics of entering and checking the payment text message requires the participants to engage in conversation:

“It has been quite fun, since normally the trader wont [sic] have had many payments that way so we get to chat a bit about whether it will work or not etc, [sic] so its been a bit more social than just handing over some cash.” [si029]

Coupled to the technological features of the T2P transaction leading to the necessity of verbal interaction, other social

factors also provided openings for more enjoyable forms of communication between transactors. Both the relative unusualness of such payments is an immediate opening for conversation:

“I think you spend more time talking to the cashiers which is quite nice. Because it’s a novelty, you start joking about it.” [ii01]

This increased time spent interacting is not just a direct consequence of technical latency, but of an engagement that develops around common interests between transactors.

Shared Values and Interests

One of the reasons that these reported sociable and relaxed interactions could occur is a plausible assumption held between parties that both buyer and seller subscribe to common collective ethical concerns:

“What I’m using it [£B] for at the moment is an indicator of what kind of place a trader is. I take it as somehow an indicator of their values.” [ii08]

These social and technical factors come together to provide a resource for conversation; it is not that both participants *need* to have an engaged conversation, but this situation provides an accountable way in which they can begin to engage with one another and build relationships from this:

“It’s still a novelty to use your phone and use the currency, more importantly, and that sparks a conversation with the people. You build a relationship with the business owners.” [ii01]

While these conversations were opportunities for exchanging first names and reinforcing common values, these discussions also opened up possibilities to new ways of using the T2P system to get access to printed £B:

“In my local cafe where I live I now am on first name terms with the manager, George. I say “George, if I pay you £B80 in Txt2Pay will you give me 60 pounds in cash?” [ii11]

Here, the informant is not talking about withdrawing notes in pounds sterling, but £B. This access to the physical notes was something of a difficult issue for many £B users, as at the time of the study, there were few places to withdraw £B in printed form, and most of these were not conveniently located from where most users lived. Access by the informant to £B60 in cash is also a significant amount of money, and falls outside the contractual expectations on £B account-holding traders to provide a service to their customers. It also imposes a small additional cost on the trader (who pays a percentage fee on T2P transactions; see below), so this is a very personal service for a valued customer, and also requires a degree of trust in the credibility of the payment being non-fraudulent. Without the social interactions formed through regular conversations and a first-name relationship that has been built up over time, this kind of interaction would seem unlikely.

MINDFUL TRANSACTIONS

As participants conducted their T2P transactions, they reported that this type of payment itself, and the interactional demands that it imposes on them provides an opportunity to think about their purchasing practices and the broader impacts of their own patterns of consumption.

The real costs of spending

For a variety of reasons that spill out of their use of T2P payments, participants reported becoming more aware of how much they spend, the real and environmental costs of their spending, as well as the implications of using SMS as a medium for payment. Users considered the £B in all of its forms “a more ethical way to spend money” [si024], and the very act of spending it, rather than cards or sterling:

“... makes you think about money in a broader sense than picking up a tomato in a supermarket and paying for it. You start to think about the supply chain, how you value it and what little effort you can do by buying it at a independent trader translates to a larger effect.” [si052]

The speed and manual entry of payments on their own devices when making T2P transactions also confronted users with considering payment in ways that they would not usually have to do when they pay with plastic in shops, as one participant described it:

“It's about seeing it on your screen and seeing the amount that you're typing in as well. I think that helps. Because usually if you go into a shop and you're paying by card, they've already entered the amount and you're just looking at accepting it and pressing go. Whereas if you have to enter the amount you need to send it's like taking money out of your pocket as well. With me it's right in your face, the number. That has a big impact.” [ii01]

Choosing considerate payments

The comparison of T2P with payment by plastic also goes beyond spending on goods to users' mindfulness around the transaction costs imposed on users (traders and their customers) of using these financial services. In this case, both bank cards and the £B typically incur costs. In the case of bank cards these fall purely on traders, but for £B users, these fees can fall on both parties, costing traders 2% (or minimum of 10p) and may cost customers any SMS charges levied by the mobile network operator (in practice, this often works out free). Problematically, T2P (and credit cards) renders transaction charges (and notably charges that *others* will incur) invisible through the interactional format of the transaction. Indeed, it is clear that these T2P costs to traders were not always recognised by customers, and in their attempts to act in a socially responsible way, some actively chose to use T2P in making payments because they thought traders would therefore avoid these costs: “[I used] the ‘Text to pay’ service, to avoid credit/debit card fees in local shops,” [si005] and that they “Don't want the local trader to have the extra cost of paying commission fees.” [si180]

While these attempts did not ultimately have the intended

result, the survey exposes these users' intentions to be considerate and responsible customers. What we are primarily concerned with here is not an interactional failure causing a misunderstanding about transaction costs (although this is interesting), but the fact that users are consciously mindful of the impact of their payment media on traders, and *actively choosing* to use one payment method over another because of their beliefs about the financial costs that they are imposing on others.

FOSTERING TRUST, THROUGH SOCIAL CONNECTIONS

As with any form of financial transaction, there are potential risks in using T2P, from fraud to outright theft. We therefore need to closely inspect the ways in which people make these trust-dependent value judgements.

Managing conditions of uncertainty

Risk and uncertainty can be experienced in various ways with the T2P system, for example, the uncertainty associated with a transactor receiving no confirmation text message about whether the amount has been deducted from or added to their account, in which case sellers risk giving away goods for free. Participants experienced this sense of uncertainty seemingly on a regular basis, as seen in this typical quote:

“I always have that nervousness. Whenever I do it, I think it's never going to come through on their phone and then the payment's going to come out of my account, and the same the other way around.” [it04]

No credible financial system can work without some form of trust, rendered through social or technical protocols. While fiat payment systems rely on users' sense of institutional trust, i.e., trust in the banking system, the T2P system operates outside those institutions and therefore cannot rely on that same sense of trust. In using T2P, users need to overcome inherent uncertainties to form a sufficient degree of trust in the transactions, the devices, the organisations involved, the individuals involved, and the various networked components that make up the T2P system. As a starting point, a sense of trust may be imported from users' understanding of *who* is involved. One participant talks about a credible outside institution, such as the city council, being a part of the scheme:

“It's great that Bristol Council supports it and it's wonderful that the staff are starting to take their salaries that way and the mayor is taking his salary in Bristol Pounds.” [ii11]

However, unless that initial trust is validated, the use of the T2P system is unlikely to be sustained. The system would simply not function without a sufficient number of users making a value judgement around the potential costs to them of *not* making a purchase, as one participant explained:

“Well if people hold back because they're not sure if it's going to work or not, it's not going to work.” [ii09]

Current levels of use would suggest that the system is working, and that a form of critical mass has been achieved, to the extent that its use is reasonably high and increasing,

rather than fading away.

Interactional trouble and judgement calls

The implementation of T2P on the SMS platform lends itself to a degree of trust in the technology. The high penetration of SMS text messaging in the UK means that users are familiar with the technology and have expectations around its transmission speed and likelihood of failure. This means that delays in the system or where there are problems in receiving confirmation of payment are normally tolerated, and may be simply ignored:

“Where they’ve had a problem with their phone, where they’ve not charged it or they can’t find it. But I’ll just show them my confirmation text and that’s been fine as well.” [ii12]

This apparent trust in the platform has to be balanced against the low value of the majority of transactions discussed here, and consequent low risk of a fraudulent behaviour having a major financial impact. At the same time, these decisions to trust the SMS platform or the device’s display text is not made independently of the social and contextual fabric against which the transaction occurs: these are not fast-paced, anonymous transactions taking place in the absence of rich social cues.

While the carrier technology and its limitations is largely understood, the lack of established protocols in making transactions using T2P means that how a transaction unfolds is negotiated on-the-fly. Our data show that this is highly locally contingent on factors as diverse as the users’ experience of network coverage in payment locations, judgements made around users’ clothing and attitude, previous encounters between them, or even balanced against the potential of trouble that failing to accept the £B might cause with the till operator’s employer if they did not take the T2P payment:

“On one occasion where it was taking a rather long time they were in a debate with a colleague about whether it would be ok to just go by my text or if that was going to give them problems.” [ii12]

When making normal transactions, payment must be seen to have been made in order to consider an exchange successful. With bank notes this is a simple matter, and with a card this is bound into the interactional process with an approval message on the display of the point-of-sale device and printing of a confirmation receipt. However, proof of payment is not always required when using T2P:

“In a number of shops they didn’t really seem that bothered [waiting for a confirmation text]. They just wrote on their till receipt the amount in £B and they file it.” [ii12]

In a similar example of non-payment, another £B member reported being allowed to walk away before the trader’s confirmation of payment had been received, contradicting previous notions of “walking away as a means of ‘closing’ a mobile interaction [8]:

“I literally had to walk away from the building in order to get a phone signal to send a text message. It was [successful].” [ii06]

This seems extraordinary; as there are few normal occasions in which people can buy something, say that they have paid, and that this be accepted. It would be plausible that the payer might not have a £B account, or have an account but have no funds in it to pay for their purchases, yet this was ignored for the purposes of finalising this particular transaction.

Building and leveraging social connections

As we have seen, interactional troubles were usually delicately negotiated through talk and the other situational features that surround the physical interaction. While these can take time to resolve, they also help build lasting connections between traders and their customers, fostering longer term networks of community and trust. One participant explained that, as a trader, her close and temporally extended relationships with customers affected her attitudes and actions around T2P difficulties resulting in non-payment, likening these technical problems to difficulties with other forms of payment:

[interviewer: Would you make them wait there?] “No I wouldn’t. I’m in a position where I know my customers. But I think if you were in the shop that would be a bit awkward. I have people I hope I’m going to see again. I’ve had people who’ve forgotten their purse and that’s fine.” [it04]

Here, instead of requiring the customer to wait until she was sure that their payment had been received, she was comfortable knowing that because of the social relationship they have built up, payment problems were solvable in other ways. The fact that this was not likely to be a one-off, impersonal interaction impacted on her expectations. In doing this, participant ‘it04’ reports drawing from the same social protocols that she used when customers forgot other means of paying (e.g. a purse). It seems that despite T2P being implemented on a different technical platform, the same kinds of social connections and methods provide resolution to these difficulties. In this sense, social and community relationships provide a bond in which trust allows for flexibility in managing payment problems. For these small-scale shopping experiences, it appears that users trust the business to better gauge whether personal contact with the customer is acceptable:

“[interviewer: Is it weird that your name is given?] No not at all. I wouldn’t like it if it was in Tesco’s but it’s a local experience anyway so it’s just part of where I live. It’s a small little shop they’re going to say “So you’re Liz would you mind if I send you regular texts?” It’s just the benefit of small interactions.” [ii05]

Thus while it is considered acceptable for local independent businesses to know a customer’s personal information, it would appear that this is not the case for large chain supermarkets (such as Tesco) to collect and use this information in the same way.

DISCUSSION AND IMPLICATIONS FOR DESIGN

Our analysis of the use and interactions around the T2P system provides an account in which these digitally mediated transactions offer opportunities for rich social interactions through which individuals are able to express themselves as members of their community and make lasting connections based on trust.

As we know from the literature, the concept of trust is complex and dynamic, in that it is built up over time under certain conditions [30, 32]. Boyd [6] connects trust with community, stating that “trust is based in the construct of community.” In our work, participants’ belief that T2P is a credible service is evident in the conversations, gamifications and reinforcements of each other’s values. The special nature of T2P transactions gives space for users to build rapport and to consider any reasons for transactional problems that might arise. In particular, there are features of this trust-based transaction that demonstrate how participants’ confidence in the T2P system is inextricably linked with their concept of community: it is negotiated on the fly, embedded in proximal social relations (c.f. [13]) and enables reciprocation of common concerns. We argue that this is centrally linked to the characteristics of the transaction process: the effort and time required for interaction and inspection does double work here, in that it also allows users to assess the probability of deceit by the person they are transacting with.

Although T2P was not designed specifically to complicate or slow down interactions between transactors, among alternative payment systems, unpredictability and slowness is not uncommon. In the case of Bitcoin, the exchange between goods and payment can be even slower. Validating transactions can last tens of minutes, exposing parties that choose to make fast payments to the risks of double spending, and making payments of large amounts undesirable [42]. One might extrapolate from our own data that recipients of Bitcoin payments would likely be similarly nervous until payment was verified, although this could be somewhat ameliorated where social connections could be leveraged to mitigate this. Supported by our data, the utilisation of local and social connections may support small co-present interactions more than remote purchases (where the majority of Bitcoin transactions currently take place). Remote purchases with Bitcoin (or other systems requiring prolonged algorithmic verification) may benefit from being linked to users’ online social networks or recommender-style systems may offer an additional means of limiting risk. Interestingly, there appear to have been no reports from the Bitcoin community of the serendipitous outcomes highlighted in our investigations that connect slow transactions with community cohesion and trust. Designers who have deliberately designed for slowness, such as Odom’s [35] study of the Photobox, have demonstrated new experiences that are possible when time is manipulated in interactions with technology. The reflection and anticipation that the Photobox evokes in its users can also be observed in the ways that T2P evoked mindfulness, conversations and

mindfulness in our own participants. While Photobox helped users to reflect on the role of technology in their everyday lives, T2P (perhaps more unintentionally) helped the £B users to build connections, to other people, to their communities, to the places they move through, to their environment, and to what they consume.

While we have pointed to several advantages that build from protracted social and technical interactions around T2P, we are not making a case that this slowness and complexity in making payments comes without costs. It is worth noting at this point that being in a position to use the T2P system takes effort: besides the effort of joining the scheme and signing up for an account there are other implicit costs. Members need to have sufficient £B in their accounts, which means they have to remember to top up their accounts. It becomes clear that in the face of so many competing demands on their time, users are making a conscious choice to engage with a cumbersome method of payment rather than waving a credit card, for example. What this trade-off illustrates is how users are making astute calculations regarding their payment options in balancing the non-trivial effort required to make use of T2P against the value they gain from it. The value in this case seems to be intertwined with the friction in the interaction thus making the cumbersome interaction a desirable option.

To think about how we could conceive of and design payment systems in light of the findings of this study, we propose a framing of transactions as *co-productions* at the *seams*. We examine these in turn below.

Co-production: As both payer and payee negotiate issues of trust, effort and value around the transactions they conduct, they are effectively participating in what can be called a *co-production* relation. Ostrom [38] explains co-production using the example of Chicago street crime where the community and police officers work together to co-create a safe environment. In co-production, power and responsibility is shared between parties to achieve a collective goal. This has been carried forward in the literature on Timebanking (see for e.g. [10]) where members synchronously provide and benefit from social services in the community. Applied to our studies of £B use, at the level of the transaction, the co-produced achievement that arises from the collaboration of both payer and payee is not only that particular successful exchange of £B for a good or service, but also (as shown by our findings) the social bonding and community engagement that arises from the personal interaction. The quote from participant ‘i11’ illustrates this concept: “*In my local cafe where I live I now am on first name terms with the manager, George. I say “George, if I pay you £B80 in Txt2Pay will you give me 60 pounds in cash?”*” In this example, participant ‘i11’ needs printed £B and the special businesses where printed £B can be withdrawn are not accessible to him. Instead, he makes use of his local café, a Bristol Pound member business. He is willing to offer £B80 in digital form in exchange for the service and the printed £B60.

Negotiating the T2P transaction to make this exchange possible participant ‘i11’ and the local café manager achieve emergent social goals that would otherwise not have been possible. It is important to recognise that a community in which co-production is on-going – indeed £B are designed for circulation – other members can benefit from its effects. In our example, as a result of the T2P transaction the café manager now has £B80 in digital form to re-spend with other member businesses, allowing new emergent social needs to be addressed in other parts of the community, and so on – in effect sustaining community relationships. Casting the transaction as an instance of co-production exposes where design challenges lie: *How can we preserve and design for the benefits of the co-produced transaction (community cohesion and trust) in a more predictable way?* Addressing this question requires articulating the collective goals that co-producing entities achieve and then providing support that allow those goals to be achieved in a collaborative manner, without unnecessary encumbrance.

Seamfulness: Monetary transactions, as an interweaving of digital technology with social spheres are a type of activity that requires moving across the *seams* discussed by Chalmers and Galani [11]. Seamful design aims to expose and transform limitations and breakdowns in systems design into opportunities to engage, convey information and be useful [18]. This concept has been taken up in mobile location-based games, with one example (Feeding Yoshi) deliberately exposing WiFi coverage and security to drive gameplay in a multiplayer game, with different WiFi conditions leading to differing game elements [2]. The T2P transaction seen here requires users to shift focus between mobile devices and the unfolding social protocol of a monetary exchange. The creative ways in which users of the T2P system filled in the temporal pauses, negotiated failed payment verifications, or dealt with network blackspots, were the ways in which these individuals collaboratively enriched the transaction. Applying the concept of seamful design to slow or unpredictable payment systems, the challenge becomes: *How can we take advantage of the seams in payment systems to enable co-production of desirable outcomes?* This is not to say that we recommend slow, complex or ambiguous payment, but recognise that these interactional ‘failures’ also present positive opportunities for action, and should not simply be regarded as flaws that demand rectification. Moreover, these seams can potentially offer practically useful interactional outcomes (for social, community, or payment verification purposes) through the design decisions made: considering these seams as opportunities is a practical and useful solution to what may be a technically insurmountable problem.

CONCLUSION

In this paper we have discussed our findings relating to the opportunities for social and material exchange afforded by the T2P transaction process. T2P may not be the most fluid or robust of payment mechanisms, yet our findings show that by choosing to use T2P users engage in a rich set of

behaviours and interactions that bring useful implications for the design of future payment systems. Transactions experienced as playful, as conversations, and as opportunities to be mindful show how T2P supports people in making connections to other people, to their communities, to the places they move through, to their environment, and to what they consume. While these social and community bonds shape the kinds of interactions that become possible, feelings of trust also shape how users feel about the social and community bonds that they hold with their co-users. We have to recognise that this is a detailed study of a small number of users, interacting with a unique technical system, and acting within a relatively small and spatially bound location: generalising the results beyond this group should be approached with care. Nevertheless, our analysis shows a number of highly relevant practices, concerns and implications that have relevancies for future payment systems that would appear to extend beyond these limits. We propose a framing of transactions as *co-productions* at the *seams*, thereby challenging designers of payment systems to view monetary transactions as achievements between collaborating agents and as opportunities for rich social interactions.

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REFERENCES

1. Arnold, M., & Reynolds, K. (2003). Hedonic shopping motivations. *Jnl. Of Retailing*, 79 (2), 77-95.
2. Bell, M., Chalmers, M., Barkhuus, L., Hall, M., Sherwood, S., Brown, B., et al. (2006). Interweaving mobile games with everyday life. In Proc. ACM CHI’06 (pp. 417-426).
3. Bellotti, V., Cambridge, S., Hoy, K., Shih, P., Handalian, L., et al. (2014). Towards community-centered support for peer-to-peer service exchange: rethinking the timebanking metaphor. In Proc. ACM CHI’14 (pp. 2975-2984).
4. Bloch, M., & Parry, J. (1989). Introduction: money and the morality of exchange. In B. & Bloch (Ed.), *In Money and the Morality of Exchange* (pp. 1-32). Cambridge, UK: CUP.
5. Bohannan, P. (1959). The impact of money on an African subsistence economy. *J. Econ. Hist.*, 19, 491–503.
6. Boyd, J. (2006). *In Community We Trust: Online Security Communication at eBay*. Retrieved April 13, 2014, from <http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2002.tb00147.x/full>.
7. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qual. Res. in Psychology*, 3(2), 77-101.
8. Broth, M., & Mondada, L. (2013). Walking Away. The embodied achievement of activity closings in mobile interaction. *Journal of Pragmatics*, 47, 41-58.
9. Buku, M., & Meredith, M. (2013). Safaricom and M-Pesa in Kenya: financial inclusion and financial integrity. *Washington Jnl of Tech. & Arts*, 8 (375).
10. Carroll, J. (2013). Co-production Scenarios for Mobile Time Banking. Proc. 4th International Symposium, IS-EUD 2013, (pp. 137-152). Copenhagen, Denmark: Springer.

11. Chalmers, M., & Galani, A. (2004). Seamful interweaving: heterogeneity in the theory and design of interactive systems. In Proc. ACM DIS '04. (pp. 243-252).
12. Cramer, H., Rost, M., & Holmquist, L. (2011). Performing a check-in: emerging practices, norms and 'conflicts' in location-sharing using Foursquare. In Proc. MobileHCI 2011 (pp. 57-66). ACM Press.
13. Dissaux, T. (2014). Endogenous development and complementary currencies in Africa. Retrieved April 13, 2014, from www.veblen-institute.org.
14. Gaver, W. (2002, June). Designing for Homo Ludens. *I3 Magazine*.
15. Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, 91(3), 481-510.
16. Greengard, S. (2011). Social games, virtual goods. *Commun. ACM*, 54(4), 19-22.
17. Guyer, J. I. (2004). *Marginal Gains: Monetary Transactions in Atlantic Africa*. University of Chicago Press.
18. Höök, K., & Löwgren, J. (2012). Strong concepts: Intermediate-level knowledge in interaction design research. *ACM Trans. Comput.-Hum. Interact.*, 19(3, Article 23).
19. Hallnäs, L., & Redström, J. (2001). Slow technology – designing for reflection. *Pers. Ubiqu. Comput.*, 5(3), 201-212.
20. Harmon, E., & Mazmanian, M. (2013). Stories of the Smartphone in everyday discourse: conflict, tension & instability. In Proc. ACM CHI '13 (pp. 1051-1060).
21. Hong, J., Price, M., Schilit, B., & Golovchinsky, G. (1999). Printertainment: printing with interactive cover sheets. In Ext. Abstracts ACM CHI'99 (pp. 240-241).
22. Huizinga, J. (1955). *Homo Ludens: a study of the play-element in culture*. Boston: Beacon Press.
23. Karame, G., Androulaki, E., & Capkun, S. (2012). Double-spending fast payments in Bitcoin. In Proc. Computer and communications security (pp. 906-917). ACM.
24. Kaye, J., McCuiston, M., Gulotta, R., & Shamma, D. A. (2014). Money talks: tracking personal finances. In Proc. ACM CHI'14 (pp. 521-530).
25. Lenz, E., Diefenbach, S., & Hassenzahl, M. (2013). Exploring relationships between interaction attributes and experience. In Proc. 6th Int. Conf. on Designing Pleasurable Products and Interfaces (DPPI '13) (pp. 126-135). ACM.
26. Mainwaring, S., March, W., & Maurer, B. (2008). From meiowaku to tokushita!: lessons for digital money design from Japan. In Proc. ACM CHI '08 (pp. 21-24).
27. Malinowski, B. (1923, 1972). Phatic communion. In Hutcheson, & Laver (Eds.), *Communication in face-to-face interaction*. Middlesex, UK: Penguin.
28. Marx, K. (1977 [1844]). Economic and philosophic manuscripts. In D. McLellan (Ed.), *Karl Marx, Selected Writings* (pp. 75–112). Oxford, UK: Oxford Univ. Press.
29. Maurer, B. (2006). The Anthropology of Money. *Annual Review of Anthropology*, 35, 5-36.
30. McKnight, D., & Chervany, N. (1996). *The Meanings of Trust*. Technical Report, University of Minnesota, Management Information Systems Research Center.
31. Menon, S., & Kahn, B. (2002). Cross-category effects of induced arousal and pleasure on the internet shopping experience. *J. Retail*, 78(1), 31.
32. Meyerson, D., Weick, K., & Kramer, R. (1996). Swift trust and temporary groups. In R. Kramer, & R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 166–195). Thousand Oaks, CA: Sage.
33. Morawczynski, O. (2010). Examining the adoption, usage and outcomes of mobile money services the case of M-PESA in Kenya. PhD Thesis, Edinburgh Uni.
34. Morawczynski, O., & Miscione, G. (2010). Trustworthy mobile transactions: a longitudinal study on M-PESA in Kenya. In Latusek, & Gerbasi (Eds.), *Trust and Technology* (pp. 160-173). Hershey, PA: IGI Global.
35. Odom, W., Sellen, A., Banks, R., Kirk, D., Regan, T., Selby, M., et al. (2014). Designing for slowness, anticipation and re-visitation: a long term field study of the photobox. Proc. ACM CHI '14 (pp. 1961-1970).
36. O'Hara, K. (2008). Understanding geocaching practices and motivations. In Proc. ACM CHI'08 (pp. 1177-1186.).
37. Ondrus, J., Lyytinen, K., & Pigneur, Y. (2009). Why mobile payments fail? Towards a dynamic and multi-perspective explanation. In Proc. IEEE HICSS, January 5–8 (pp. 1-10).
38. Ostrom, E. (1996). Crossing the great divide: Co-production, synergy, and development. *World Development*, 24(6), 1073-1087.
39. Placencia, M. (2004). Rapport-building activities in corner shop interactions. *Journal of Sociolinguistics*, 8, 215-245.
40. Pohjanpalo, K. (2014). Bitcoin Judged Commodity in Finland After Failing Money Test. Retrieved June 4, 2014, from <http://www.bloomberg.com/news/2014-01-19/bitcoin-becomes-commodity-in-finland-after-failing-currency-test.html>.
41. Simmel, G. (1990 [1907]). *Philosophy of Money*. London: Routledge.
42. Singh, P., Chandavarkar, B., Arora, S., & Agrawal, N. (2013). Performance Comparison of Executing Fast Transactions in Bitcoin Network Using Verifiable Code Execution. In Proc. IEEE ADCONS '13 (pp. 193 - 198).
43. Sparshot, J. (2013). Web Money Gets Laundering Rule. Retrieved June 4, 2014, from <http://online.wsj.com/news/articles/SB10001424127887324373204578374611351125202>.
44. Sundar, S., Dou, X., & Lee, S. (2013). Communicating in a ubicomp world: interaction rules for guiding design of mobile interfaces. In Proc. INTERACT 2013, Part II, LNCS 8118 (pp. 730–747). Springer.
45. Vines, J., Dunphy, P., & Monk, A. (2014). Pay or Delay: The Role of Technology When Managing a Low Income. In Proc. ACM CHI'14 (pp. 501-510).
46. Visa (2014). Retrieved June 4, 2014, from Visa: http://www.visaeurope.com/en/cardholders/visa_paywave.aspx.
47. Wang, Y., & Mainwaring, S. (2008). Human-Currency Interaction: learning from virtual currency use in China. In Proc. ACM CHI '08 (pp. 25-28).
48. Weber, M. (2011). *The Protestant ethic and the spirit of capitalism*. (S. Kalberg, Trans.) NY: OUP.
49. Yang, J., Ackerman, M., & Adamic, L. (2011). Virtual gifts and guanxi: supporting social exchange in a chinese online community. In Proc. ACM CSCW '11 (pp. 45-54).
50. Zelizer, V. (2011). *Economic Lives*. Princeton: Princeton University Press.
51. Zelizer, V. (1989). The Social Meaning of Money: "Special Monies". *American Journal of Sociology*, 95(2), 342-377.